A range of dynamic vehicle axle loadings and static tracked plant loadings (piling rigs and crawler cranes) were assessed along the route.

Supporting the construction of HS2's longest viaduct

A total of 56 piers will span the 3.4km viaduct. Also, a working platform at each on-land pier location will be required, together with interconnected temporary site roads and compounds.

CLIENT'S CHALLENGE

The temporary site roads and working platforms in parts of the site were close to existing lakes with shallow ground-water encountered. A need to limit excavation above the groundwater table and avoid exacerbating disturbance of sensitive subgrade soils was key to ensure construction proceeded smoothly without delay on critical elements, such as the piling rig and crawler crane operations.

TENSAR SOLUTION

Tensar provided an indemnified design service which has RISQS accreditation for working in the Rail sector. The basis of the road design was a mechanically stabilised aggregate layer that would support dynamic loads from repeated vehicle axle movements (stone delivery vehicles, concrete mixers) in addition to tracked plant that would be travelling along the site road between platforms. At the working platform locations, additional static loading assessments were carried out for various rigs and crawler crane operations, utilising Tensar's T-Value working platform design methodology to optimise the construction depth thickness.

HS2 Colne Valley Viaduct

Temporary Site Roads & Working Platforms

Buckinghamshire to Hillingdon, UK

BENEFITS

40% CO_2 savings
estimated for working platform construction

25,000m3 reduction of imported fill
estimated for site works

2,000 lorry movements taken off the road
estimated from reduced import of quarried aggregates

£700,000 cost savings
estimated against conventional stone only build-up

Mechanical stabilisation
of granular layer avoided intrusive chemical treatment

REF TEN426

Ground conditions varied considerably across the site with a challenge of limiting excavation due to it encroaching on the groundwater table.

PROJECT BACKGROUND

Tensar were consulted by Align JV delivering the Central 1 portion of HS2 Phase One, which includes a viaduct over the Colne Valley. A free of charge feasibility assessment was provided for multiple working platforms along the viaduct route. This was to understand potential thickness reductions in comparison to the original consultant's design based upon BR470 Guide to Good Practice (2004).

The initial assessment indicated that for anticipated ground conditions with an undrained shear strength Cu 50kPa, a Tensar Mechanically Stabilised Layer comprising of class 6F5 granular fill incorporating a Tensar TriAx geocomposite would offer savings of around 40% when compared with original platform proposals, whilst maintaining the performance requirement of tracked plant which would be used in the areas.

A range of standard haul roads and platform build-ups were developed for ground conditions in the range of Cu 30-50kPa and additional loading cases at specific locations, including a 160t crawler crane for Jetty Platforms. This was formalised into working drawings, which were referenced in the main scheme design drawings for the site team to follow.

Continued technical support was available througout the construction phase, with quick turnaround of revised design assessments when required due to unexpected ground conditions and changed rig loadings. An area of particularly poor ground was encountered at one of the working platform locations with lower Cu 15kPa adopted, which Tensar was able to address with locally thickened platform without the requirement for full excavation of very weak subsoils.

Main Contractor
Align JV

Sub-Contractor
Roadbridge

"Tensar provided a value engineered design which was practical to apply and allowed for flexibility across varying site conditions. Furthermore, Tensar supported us in reducing the carbon footprint of our works.

We were pleased by the level of technical support provided throughout , which helped to overcome any challenges encountered on site."

Daniel Puentes
Package Manager
Align JV

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